

REMARKS

Claims 1-39 and 41-48 are pending. By this Response, claims 1-3, 6, 10, 11, 18, 19, 25, 31, 33, 36, 38 and 39 are amended, claim 40 is cancelled and claims 41-48 are added. Formal drawings are provided and the specification is amended. Reconsideration and allowance based on the above amendments and following remarks are respectfully requested.

Foreign Priority

Applicants appreciate the acknowledgement of applicants claim for foreign priority. Applicants have attached hereto a certified copy of the application to satisfy the requirements of 35 U.S.C. §119(b).

Drawings

The Office Action objects to the drawings due to minor corrections. In response, corrected formal drawings are attached hereto. Accordingly, withdrawal of the objection is respectfully requested.

Specification

Applicants note that the specification has been amended to clarify the features disclosed therein. No new matter has been added.

Prior Art Rejection

The Examiner rejects claims 1-40 under 35 U.S.C. §102(e) as being anticipated by Schuessler, et al. (U.S. Patent No. 6,047,892). This rejection is respectfully traversed.

Schuessler teaches a system that utilizes a bar coding technology to encode various data. The bar coding system of Schuessler prints the bar code in a limited number of variants. The bar code allows for greater density of coded data by using two (2) types of code words (i.e. row address code words and data code words). The PDF 417 encoding scheme is used to encode data code words with source text or error correction information. In this scheme, the set of the PDF417 code words consist of three (3) clusters of code words with each cluster comprising a full character set. No two (2) adjacent rows of code words have data code words belonging to the same cluster. By combining the PDF417 with a micro PDF417 code, in the representation of rows, columns and spaces, more data can be encoded within the bar code.

In contrast, Embodiments of the present invention provide a coding technique that codes non-sequential data by using a sequence of symbols where each sub-sequence in the sequence is unique and not reproduced over the sequence. This type of sequence is sometimes called a de Bruijn sequence, pseudo random sequence or n-sequence. The de Bruijn sequence may be used in different manners. As one example, data may be coded in the differences in positions in the de Bruijn sequence of adjacent portions of the sequence

arranged in a matrix. See fig 2 and 5a and 5b. Fig 2 shows the matrix or coding pattern. Each column in the pattern of Fig 2 includes a portion of a de Bruijn sequence, which has the characteristic that any subsequence of a predetermined magnitude of the sequence is unique within the sequence and have an unambiguous position within the sequence. Each portion is at least of the above-mentioned predetermined magnitude. In fig 2 the portions of the sequence (i.e. the columns) are longer than the subsequence of the predetermined magnitude which subsequence in this example has the length of 5 symbols. The columns can have the same length as the sequence or may even be longer. In the latter case the sequence is just repeated.

In reference to Fig. 2, the coding pattern is schematic and all symbols are shown as being identical. In Fig. 5a, a small part of the coding pattern is shown more in detail. Here the symbols are dots which are displaced in different directions from raster intersection points. Each displacement direction (right, up, left, down) represents a different value (0, 1, 2, 3) as seen in Fig. 5b. Each column of numbers in the upper part of Fig. 5b is a subsequence of a de Bruijn sequence of base 4. Each subsequence has an unambiguous position in the de Bruijn sequence. The positions are 813, 581, 320, 512, 96. The differences between these positions are 232, 262, 832 and 416 (modulo 1024). These differences can be used for coding a character or another piece of information. The differences may moreover be used for coding a position sequence running along the reading direction of the coding pattern. The position sequence may

be a de Bruijn sequence, such that an arbitrary subsequence of a predetermined magnitude of the position sequence uniquely and unambiguously defines a position of the subsequence in the position sequence.

By coding the non-sequential data in the manner above, the coding pattern can, e.g., be scanned or read at an arbitrary height, like a one-dimensional barcode. The same result will be obtained regardless of the height at which the coding pattern is read. This is illustrated in Fig. 8, see reference numbers 40, 41, 48 and 50.

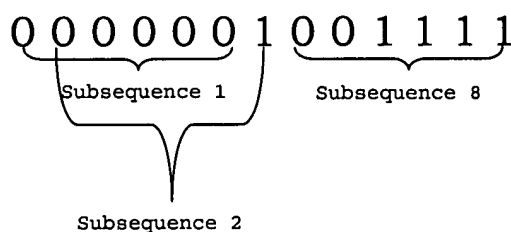
If the sequence portions also code at least part of a position value which defines a serial number of the sequence portion, as claimed in e.g. claim 39, the position values of the sequence portions may furthermore be used to determine whether a character from a subsequently recorded image has already been recorded. Also, if some part of the coding pattern is not recorded, the coding pattern can be read anew and the position values used for determining which part of the coding pattern was not recorded the first time. See paragraphs 32 and 33.

To provide the Examiner with a better understanding of the coding technique of the claimed invention, the following example is provided. Below is a binary sequence having de Bruijn characteristics where every subsequence of six bits is unique.

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0,0,0,0,0,0,1,0,0,1,1,1,1,1,0,1,0,0,1,0,0,0,0,1,1,1,0,
1,1,1,0,0,1,0,1,0,1,0,0,0,1,0,1,1,0,1,1,0,0,1,1,0,1,0,
1,1,1,0,0,0,1,1
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As can be seen from the above, any subsequence of six (6) bits is unique, meaning it is not repeated anywhere else in the sequence. Thus, the subsequences have a unique and unambiguously determined position in the sequence.

A closer look at the first 13 bits in the sequence provides a clearer illustration of the unique subsequences contained therein. As illustrated below, the first 13 bits provide 8 complete and unique 6 bit subsequences, having positions 1 to 8 within the sequence.

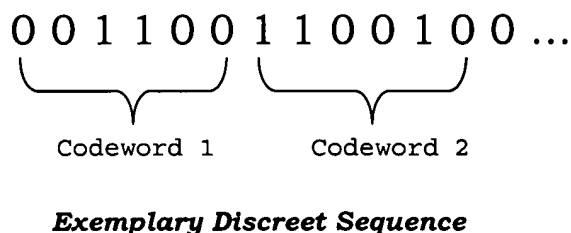


Exemplary de Bruijn Sequence

The Examiner refers to column 6, lines 59-66 for teaching this particular sequencing feature of applicants' claims. Applicants respectfully submit, however, that this particular teaching in Schuessler merely teaches codewords that are provided in sets of three (3) clusters. No two (2) adjacent rows of code words have data codewords belonging to the same clusters. This just means that data codewords from adjacent rows belong to different clusters and that any ambiguity in a data codeword's row location can be resolved.

Further, the Office Action at page 3, refers to the claimed “arbitrary subsequence” as being the same as a cluster of codewords in Schuessler. Applicants respectfully disagree with this assertion.

Nowhere does Schuessler teach the cluster of codewords as being part of a sequence. However, even if Schuessler’s codewords were part of a sequence, the sequence would not have the characteristic of every subsequence of a predetermined magnitude of the sequence being unique within the sequence. For example if Schuessler’s clusters were positioned in a sequence, using the six bit example, it would form a sequence similar to the following exemplary sequence of discreet codewords, where the second codeword follows after the end of the first codeword without any overlap between the codewords. See also Fig 6 in Schuessler.



As illustrated above, Schuessler’s coding techniques are entirely different from the claimed coding method system and apparatus. Thus, Schuessler fails to teach, *inter alia*, that non-sequential data is coded to a coding pattern, which comprises subsequences of at least one sequence which has the characteristic that an arbitrary subsequence of a predetermined magnitude of the sequence is unique within the

sequence and unambiguously defines a position of the subsequence in the sequence, as recited in claims 1, 10, 18, 25, 31, 33, 36, 38 and 39.

Further, the Office Action in the rejection of claims 2, 3 and 11 refer to the 52 coding patterns shown in Fig. 3 of Schuessler. Applicants' respectfully submit that these codes are address code patterns and not patterns for coding non-sequential data. See column 7, lines 52-67. Further, these codewords are separate from the PDF417 codewords of which, in the rejection of the independent claims, the Office Action alleges corresponds to applicant's claimed coding sequence and subsequences. Furthermore, even if these address code patterns were positioned in a sequence they would form a discreet sequence like the one illustrated above. The sequence would not provide every subsequence as being unique within the sequence as in applicants' invention.

Thus, dependent claims 2-9, 11-17, 19-24, 26-30, 32, 34, 35, 37 and 41-48 are likewise distinguishable over Schuessler for the reasons above.

In view of the above, applicants respectfully submit that Schuessler fails to anticipate the claimed invention. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

For at least these reasons, it is respectfully submitted that claims 1-48 are distinguishable over the cited art. Favorable consideration and prompt allowance are earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of \$420.00 is attached hereto.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad J. Billings (Reg. No. 48,917) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment(s)